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Methane Emissions From U.S. Coal Mines in 1980

By Roy H. Grau III and John C. LaScola

UNITED STATES DEPARTMENT OF THE INTERIOR

Information Circular 8987

(United States Bureau of Mines)

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William P. Clark, Secretary

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

cft	cubic foot per ton	Mtpy	thousand short tons per year
ft	foot	pct	percent
ft^3	cubic foot	yr	year
MMcfd	million cubic feet per day		

METHANE EMISSIONS FROM U.S. COAL MINES IN 1980

By Roy H. Grau III[1] and John C. LaScola[2]

ABSTRACT

This Bureau of Mines report contains a tabulation of methane emissions during 1980 for all coal mines located in the United States with emissions greater than 0.1 MMcfd. Listed for each mine are methane emission quantity, location, and coalbed. The report also compares records of 1975 and 1980 and describes relationships between emissions in 1980 and the Bureau's coalbed gas content data on 11 mines.

INTRODUCTION

Methane gas is a threat to safety in underground coal mines. Research by Government and industry has led to great gains in reducing methane gas ignitions and explosions. The development of advanced methane control techniques is necessary for the safe operation of more gassy mines and the implementation of rapid mining techniques.

As part of this research, the Bureau of Mines has surveyed total methane emission data from underground bituminous coal mines in the United States and tabulated emissions from mines producing over 0.1 MMcfd of methane. This report is an update of similar studies previously described in Information Circulars 8733, 8659, and 8558 (2-4).[3]

The data from 1980 were compiled from Mine Safety and Health Administration (MSHA) records of air quality-quantity inspections made quarterly at each mine. The inspections involve measuring airflow and collecting air samples in the main returns. From these data, an average methane emission is calculated and used to represent the daily mine emission for each quarter. The methane emissions given in this report are the averages of the four 1980 quarters and do not include mine emissions from other sources such as degasification projects. Since a previous Bureau study showed that emissions from mines emitting less than 0.1 MMcfd represented only 2 pct of all emissions, 0.1 MMcfd was chosen as a lower limit for data collection (4).

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[3]Underlined numbers in parentheses refer to items in the list of references preceding the appendix.

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DISCUSSION OF RESULTS

METHANE EMISSION STATISTICS

During 1980, 200 underground coal mines in the United States had methane emissions of at least 0.1 MMcfd. These mines are listed in order of highest emissions to lowest in table A-1 in the appendix and alphabetically by coalbed in table A-2. Both tables contain each mine's respective coalbed, State, and county. The emissions from all mines totaled 256.3 MMcfd, and the mines were distributed through 11 States and 64 counties.

A comparison of the emission data for 1975 (2) and 1980 is shown in table 1. Total emissions increased from 216.3 MMcfd in 1975 to 256.3 MMcfd in 1980. The number of mines emitting 0.5 MMcfd or less decreased by 9.0 pct, but the gas emitted from this group remained at 8.0 pct. Also, there was an increase in the number of mines producing between 0.5 and 1.0 MMcfd, as well as those producing over 1.0 MMcfd. However, in both categories, the percentage of emissions they contributed to the total amount in 1975 and 1980 was almost equal. The overall increase in methane emissions from 1975 to 1980 may have been caused by a variety of factors such as new mines in gassier seams, an increase in the size of the mines, and the fact that 1980 coal production for underground bituminous coal mines in the United States was 337 million short tons compared with 293 million short tons in 1975.

Table 2 gives a comparison of the 10 mines with the highest emissions in 1975 and 1980. The emissions from the 10 highest producing mines increased from 66.8 MMcfd in 1975 to 82.8 MMcfd in 1980. Although the mines that are listed as top gas producers in 1975 were all active operations in 1980, six were replaced in the 1980 list by different mines, all of which were located in Alabama or Virginia. Interestingly, these six mines ranged from 4 to 14 yr old while five of the six mines that were replaced were at least 30 yr old. Although this seems to indicate that a direct relationship exists between emissions and age, a more in-depth observation shows that there is no singular relationship between the two (4). For instance, in 1980 the following mines had these respective ages and emissions:

Blue Creek No. 4.....	6 yr	16.5 MMcfd
Blue Creek No. 5.....	5 yr	6.2 MMcfd
Loveridge No. 22.....	29 yr	8.2 MMcfd

TABLE 1. - Comparison of emissions in 1975 and 1980

Emission rate, MMcfd	Mines		Emissions	
	Number	pct of total	Volume, MMcfd	pct of total
1975				
≥0.1 but <0.5.....	103	52	18.4	8
≥0.5 but <1.0.....	33	17	20.7	10
≥1.0.....	60	31	177.2	82
Total ≥0.1.....	196	100	216.3	100
1980				
≥0.1 but <0.5.....	86	43	19.9	8
≥0.5 but <1.0.....	44	22	30.2	12
≥1.0.....	70	35	206.2	80
Total ≥0.1.....	200	100	256.3	100

TABLE 2. - Comparison of the 10 mines with the highest emissions in 1975 and 1980

Mine	Mine age, yr	Methane emission, MMcfd	Mine production, Mtpy	Methane emitted per ton of coal, ft^3
1975				
Loveridge No.22	24	11.6	2,022	2,094
Humphrey No. 7	20	9.3	2,229	1,523
Federal No. 2	8	8.1	937	3,155
Blacksville No. 2	6	6.2	1,548	1,462
Osage No. 3	33	5.9	1,575	1,367
Beatrice	12	5.6	715	2,859
Concord No. 1	30	5.1	1,361	1,368
Olga	52	5.1	1,174	1,586
Robena	37	5.0	2,589	705
Bethlehem No. 32	59	4.9	NAp	NAp
Total	NAp	66.8	14,150	1,723
1980				
Blue Creek No. 4	6	16.5	752	8,009
Blue Creek No. 3	7	11.1	1,015	3,992
Loveridge No. 22	29	8.2	2,142	1,397
Virginia Pocahontas No. 3	12	7.8	920	3,156
Federal No. 2	13	7.6	1,514	1,832
VP No. 5	4	7.3	610	4,368
Humphrey No. 7	25	7.2	2,146	1,225
Blue Creek No. 5	5	6.2	158	14,323
Virginia Pocahontas No. 1	14	5.6	841	2,430
Blacksville No. 2	11	5.3	2,264	854
Total	NAp	82.8	12,344	2,448

NAp Not applicable.

Previous Bureau studies have reported conflicting data on how emissions are affected by coal mine production (4-6, 8). Data from this report show that no singular relationship exists between emissions and production. This can be confirmed by reviewing the three highest emitting mines in 1980 with their respective emissions and coal production:

Blue Creek No. 4.	16.5 MMcfd	752 Mtpy
Blue Creek No. 3.	11.1 MMcfd	1,015 Mtpy
Loveridge No. 22.	8.2 MMcfd	2,142 Mtpy

If age and production do affect emissions, it is in combination with other factors such as coalbed gas content, geology, permeability, rib length, etc., all of which would combine to alter the emission rate.

Figure 1 compares total emissions, number of mines, and mean and median emissions of all mines for 11 states. Analogous to the large portion of emissions produced by a small percentage of mines, a large percentage of emissions occur in a few select States and counties. Although mines were located in 11 States, West Virginia, Alabama, Pennsylvania, and Virginia together had emissions that totaled 215.3 MMcfd or 84 pct of total emissions. Additionally, these 4 States contain 11 counties with the highest emission rates of all counties, greater than 7.2 MMcfd each. Although these counties represent only 17 pct of the 64 counties listed, they contain mines that produce 72 pct of all emissions. Figure 1 also shows that depending upon location, total emissions can be largely dependent upon either the number of mines or the average emission per mine. Noteworthy is Alabama, which has only 14 listed mines yet produces the second highest total emissions and has the highest mean and median emission per mine for any State.

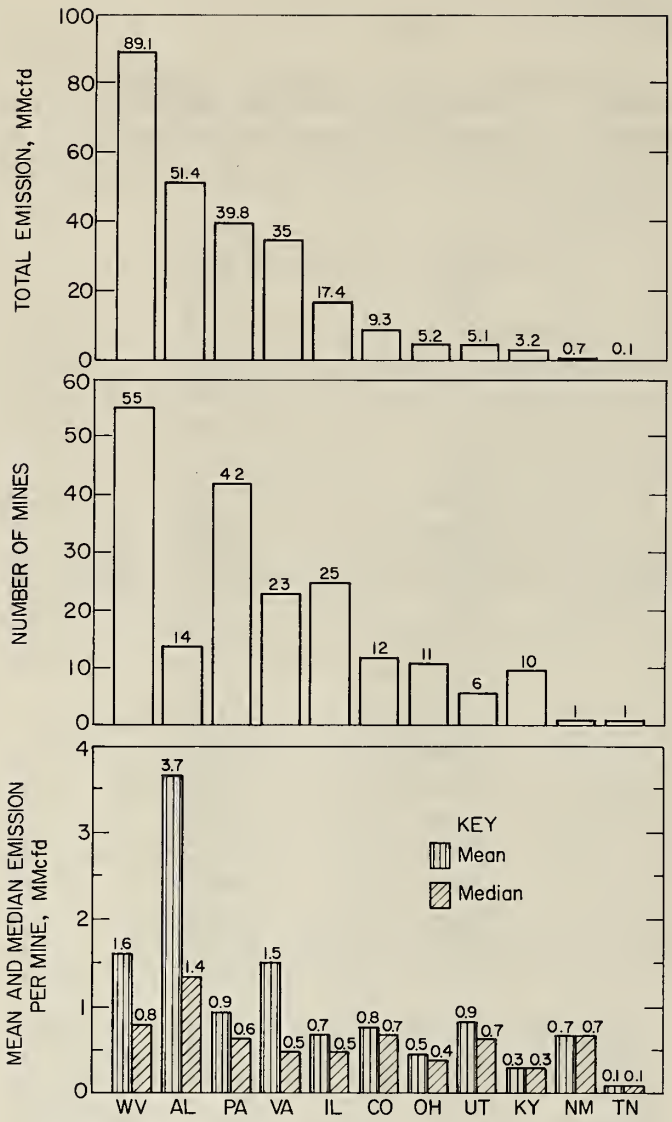

FIGURE 1. - Emissions, number of mines, and mean and median emissions per mine for 11 States.

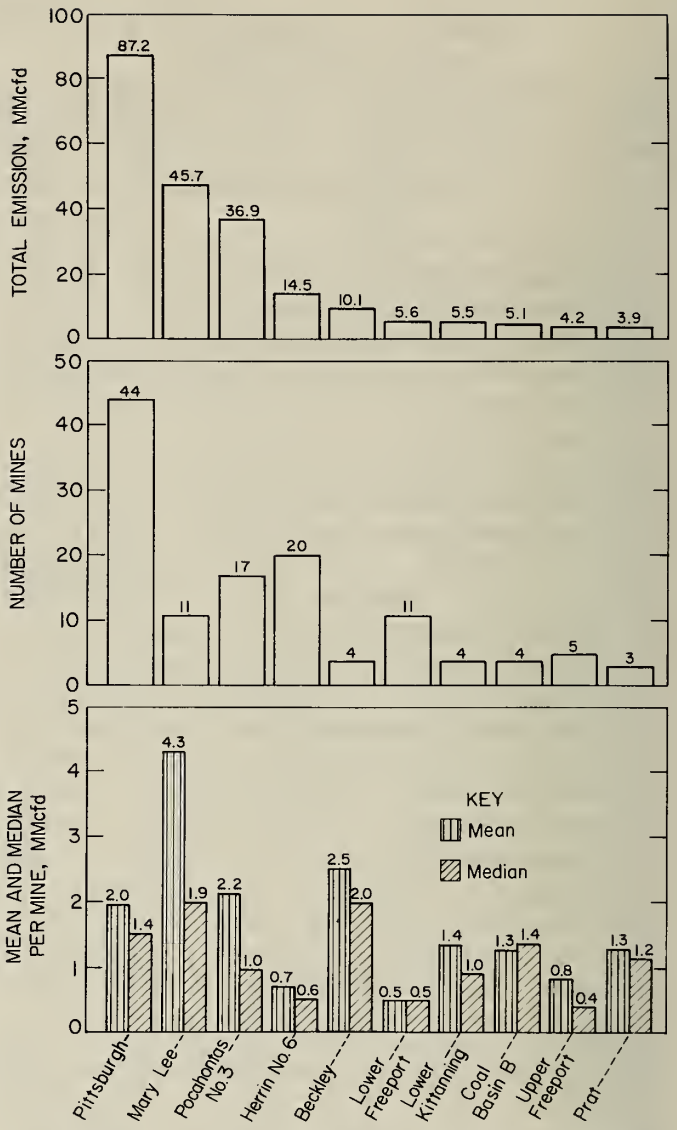

FIGURE 2. - Total emissions, number of mines, and mean and median emissions per mine for the 10 highest emitting coalbeds.

During 1980, 17 of the total 48 coalbeds had total emissions greater than 1.0 MMcfd. Total emissions, number of mines, and mean and median emissions per mine for the 10 largest methane producing coalbeds are shown in figure 2. The Pittsburgh, Mary Lee, and Pocahontas No. 3 Coalbeds accounted for 67 pct of all emissions. The Pittsburgh Coalbed has the most mines and highest total emission, but the Mary Lee Coalbed is second in emissions and is the highest in gas emissions per mine.

EMISSION TREND ANALYSIS

Since the early 1970's, Bureau research has focused on creating a methodology for predicting methane emissions. Irani (4) showed a relationship between methane emissions and the product of depth and coal production for four major coalbeds. During the same time period, the Bureau developed a direct method of determining the methane content of coal samples

obtained from vertical exploration cores (9). Diamond (1) gives a complete description of the direct method, including 583 test results from 125 coalbeds in 15 States. The final product of this methodology is gas content per unit weight of coal, which can be used as an indicator of the coalbed gas content. Although Kissell (9) has shown a relationship between measured gas content and methane emissions, additional data on gas content, presented in this report, provide a new insight into the relationships between total gas content, depth, and methane emission.

Total gas content is not the only factor affecting the rate at which methane will enter a mine airway. Parameters such as production, mining methods, methane drainage, mine size, geologic conditions, permeability, porosity, and water saturation are also important aspects affecting methane emissions. Although these factors could not be evaluated for this report, the *general* relationships between total mine emissions, total gas content, and depth for 1980 data can be shown.

Table 3 shows 11 mines from which the Bureau has both 1980 emission records and at least one coal core taken on mine property. These mines had emissions between 0.4 and 7.3 MMcfd, not including emissions from degasification programs or vertical borehole gob drainage. The mines were located in seven different coalbeds with coal core depths from 427 to 2,185 ft. Production ranged from 372 to 1,448 Mtpy. Figure 3 shows the graph of gas content versus depth for the mines listed and indicates that gas content will increase with depth (7). It is true to some extent that the higher the gas content, the higher the emissions; however, the gas content data do not take into account that coalbed permeabilities generally decrease in deeper coalbeds and thus restrict methane emissions (11).

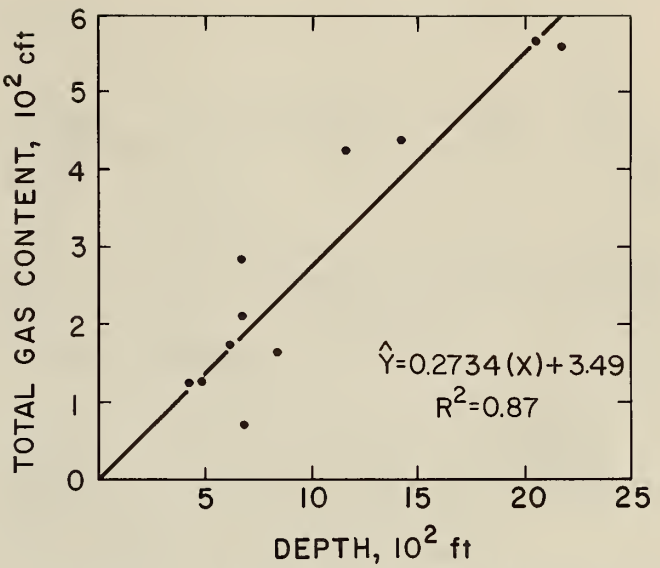

FIGURE 3. - Total gas content versus depth of coal. ($\hat{Y}$ = estimated total gas content; X = depth; R^2 = coefficient of determination.)

TABLE 3. - Mines with measured total gas content data and emissions greater than 0.1 MMcfd

Mine	Coalbed[1]	Total emissions, MMcfd	Gas content, cft	Core depth, ft
Newfield.....	Freeport (U)....	0.4	124	491
McClure No. 1.....	Jawbone.....	1.0	279	679
Kitt No. 1.....	Kittanning (L)..	1.5	171	622
Oak Grove.....	Mary Lee (L)....	5.0	423	1,174
Blue Creek No. 5.....	...do.....	6.2	557	2,185
Mary Lee No. 1.....	Mary Lee (U)....	1.9	69	681
Cumberland.....	Pittsburgh.....	4.7	163	839
Emerald.....	...do.....	2.0	211	676
Vesta No. 5.....	...do.....	1.4	122	427
Beatrice.....	Pocahontas No. 3	4.5	435	1,430
VP No. 5.....	...do.....	7.3	564	2,061

[1]U = Upper; L = Lower.

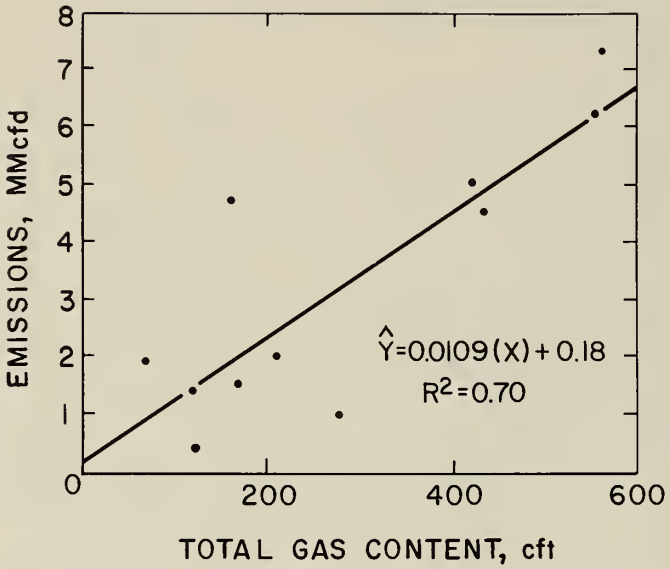

FIGURE 4. - Methane emissions versus total gas content. ($\hat{Y}$ = estimated emissions; X = total gas content; R^2 = coefficient of determination.)

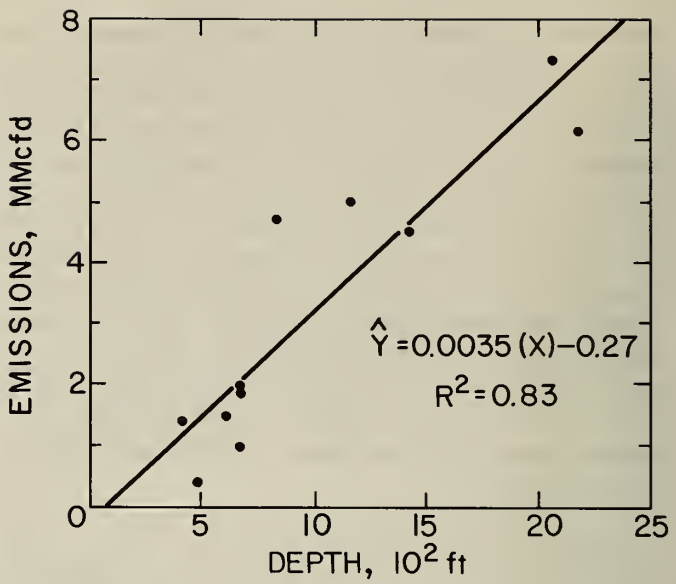

FIGURE 5. - Emissions versus depth of coal. ($\hat{Y}$ = estimated emissions; X = depth; R^2 = coefficient of determination.)

The relationship of methane emissions to methane gas content can be observed in figure 4, which may denote that gas content should be used only as an indicator of the relative gassiness of the coalbed and not to predict the exact methane quantities emitted. A similar relationship is presented in figure 5, which shows methane emission versus depth. A slightly better relationship appears for emissions compared with depth than for emissions compared with gas content, possibly because with deeper mines permeability decreases and gas content increases (7, 11).

CONCLUSION AND SUMMARY

In 1980, there were 200 bituminous coal mines within the United States emitting at least 0.1 MMcfd, with total emissions equaling 256.3 MMcfd. Methane emissions increased by 40.0 MMcfd since the last Bureau survey in 1975. Seventy mines had emissions of 1.0 MMcfd or more, which accounted for 80 pct of the total daily emissions. The mines listed in this report are located in 48 coalbeds, 17 of which have total emissions greater than 1.0 MMcfd. The Pittsburgh, Mary Lee, and Pocahontas No. 3 Coalbeds accounted for 67 pct of all methane emitted. Although the mines were located in 11 States, West Virginia, Alabama, Pennsylvania, and Virginia accounted for 84 pct of the total emissions.

Coal core gas content data were available for 11 mines. Relationships were established between gas content and depth, emissions and gas content, and emissions and depth.

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APPENDIX.—COAL MINES WITH EMISSIONS OF AT LEAST 0.1 MMcfd

TABLE A-1.—Coal mines with emissions of at least 0.1 MMcfd, listed by order of emissions

(Within emission levels, listing is alphabetical by company name)

	METHANE, MMCFO	COMPANY NAME	MINE NAME	COUNTY	STATE	COALBED[1]
1	16.5	JIM WALTER RESOURCES INC	BLUE CREEK NO 4 MINE	TUSCALOOSA	AL	MARY LEE
2	11.1	JIM WALTER RESOURCES INC	BLUE CREEK NO 3 MINE	JEFFERSON	AL	MARY LEE
3	8.2	CONSOLIDATION COAL CO	LOVERIDGE NO 22 MINE	MARION	WV	PITTSBURGH
4	7.8	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 3 MINE	BUCHANAN	VA	POCAHONTAS NO 3
5	7.6	EASTERN ASSOCIATED COAL CORP	FEDERAL NO 2 MINE	MONONGALIA	WV	PITTSBURGH
6	7.3	VP 5 MINING CO	VP NO 5 MINE	BUCHANAN	VA	POCAHONTAS NO 3
7	7.2	CONSOLIDATION COAL CO	HUMPHREY NO 7 MINE	MONONGALIA	WV	PITTSBURGH
8	6.2	JIM WALTER RESOURCES INC	BLUE CREEK NO 5 MINE	TUSCALOOSA	AL	MARY LEE
9	5.6	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 1 MINE	BUCHANAN	VA	POCAHONTAS NO 3
10	5.3	CONSOLIDATION COAL CO	BLACKSVILLE NO 2 MINE	MONONGALIA	WV	PITTSBURGH
11	5.1	BECKLEY COAL CO	BECKLEY MINE	RALEIGH	WV	BECKLEY
12	5.0	CONSOLIDATION COAL CO	ARKWRIGHT MINE	MONONGALIA	WV	PITTSBURGH
13	5.0	UNITED STATES STEEL CORP	OAK GROVE MINE	JEFFERSON	AL	MARY LEE
14	4.7	CONSOLIDATION COAL CO	OSAGE NO 3 MINE	MONONGALIA	WV	PITTSBURGH
15	4.7	UNITED STATES STEEL CORP	CUMBERLAND MINE	GREENE	PA	PITTSBURGH
16	4.5	BEATRICE POCAHONTAS CO	BEATRICE MINE	BUCHANAN	VA	POCAHONTAS NO 3
17	4.4	CONSOLIDATION COAL CO	BLACKSVILLE NO 1 MINE	MONONGALIA	WV	PITTSBURGH
18	4.2	JIM WALTER RESOURCES INC	BLUE CREEK NO 7 MINE	TUSCALOOSA	AL	MARY LEE
19	3.4	BETHLEHEM MINES CORP	BETHLEHEM NO 32 & 33 MINE	CAMBRIA	PA	KITTANNING (L)
20	2.9	CONSOLIDATION COAL CO	PURSGLOVE NO 15 MINE	MONONGALIA	WV	PITTSBURGH
21	2.8	JONES & LAUGHLIN STEEL CORP	GATEWAY MINE	GREENE	PA	PITTSBURGH
22	2.8	UNITED STATES STEEL CORP	GARY NO 50 MINE	WYOMING	WV	POCAHONTAS NO 3
23	2.6	EASTERN ASSOCIATED COAL CORP	FEDERAL NO 1 MINE	MARION	WV	PITTSBURGH
24	2.5	HELEN MINING CO	HOMER CITY MINE	INDIANA	PA	FREEPORT (U)
25	2.5	MAPLE MEADOW MINING CO	NO 1 MINE	RALEIGH	WV	BECKLEY
26	2.3	OLD BEN COAL CO	OLD BEN NO 25 MINE	FRANKLIN	IL	HERRIN NO 6
27	2.2	CONSOLIDATION COAL CO	IRELAND MINE	MARSHALL	WV	PITTSBURGH
28	2.2	CONSOLIDATION COAL CO	MONTOUR NO 4 MINE	WASHINGTON	PA	PITTSBURGH
29	2.1	UNITED STATES STEEL CORP	ROBENA MINE	GREENE	PA	PITTSBURGH
30	2.0	CONSOLIDATION COAL CO	ROBINSON RUN NO 95 MINE	HARRISON	WV	PITTSBURGH
31	2.0	EMWAY RESOURCES INC	EMERALO MINE	GREENE	PA	PITTSBURGH
32	2.0	JONES & LAUGHLIN STEEL CORP	OLGA MINE	MCDOWELL	WV	POCAHONTAS NO 4, SEWELL
33	2.0	KAISER STEEL CORP	SUNNYSIOE NO 1 MINE	CARBON	UT	SUNNYSIDE (U&L)
34	1.9	ALABAMA BY-PRODUCTS CORP	MARY LEE NO 1 MINE	WALKER	AL	MARY LEE
35	1.8	MATHIES COAL CO	MATHIES MINE	WASHINGTON	PA	PITTSBURGH
36	1.7	CONSOLIDATION COAL CO	SHOEMAKER MINE	MARSHALL	WV	PITTSBURGH
37	1.7	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 2 MINE	BUCHANAN	VA	POCAHONTAS NO 3
38	1.6	BETHLEHEM MINES CORP	MARIANNA NO 58 MINE	WASHINGTON	PA	PITTSBURGH
39	1.6	MID-CONTINENT RESOURCES INC	COAL BASIN MINE	PITKIN	CO	COAL BASIN B
40	1.5	AMAX COAL CO	WABASH MINE	WABASH	IL	HARRISBURG
41	1.5	BECKLEY LICK RUN CO	BONNY MINE	RALEIGH	WV	BECKLEY
42	1.5	CONSOLIDATION COAL CO	MCELROY MINE	MARSHALL	WV	PITTSBURGH
43	1.5	FREEMAN UNITEO COAL MINING CO	ORIENT NO 3 MINE	JEFFERSON	IL	HERRIN NO 6
44	1.5	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 4 MINE	BUCHANAN	VA	POCAHONTAS NO 3
45	1.5	REPUBLIC STEEL CORP	KITT NO 1 MINE	BARBOUR	WV	KITTANNING (L)
46	1.5	UNITED STATES STEEL CORP	CONCORO MINE	JEFFERSON	AL	PRATT
47	1.4	CONSOLIOATION COAL CO	AMONATE NO 31 MINE	MCOOWELL	WV	POCAHONTAS NO 4
48	1.4	CONSOLIDATION COAL CO	CONSOL NO 20 MINE	MARION	WV	PITTSBURGH
49	1.4	ITMANN COAL CO	ITMANN NO 3 MINE	WYOMING	WV	POCAHONTAS NO 3
50	1.4	JONES & LAUGHLIN STEEL CORP	VESTA NO 5 MINE	WASHINGTON	PA	PITTSBURGH
51	1.4	MID-CONTINENT RESOURCES INC	OUTCH CREEK NO 2 MINE	PITKIN	CO	COAL BASIN B
52	1.4	MONTEREY COAL CO	MONTEREY NO 1 MINE	MACOUPIN	IL	HERRIN NO 6
53	1.3	BETHLEHEM MINES CORP	SOMERSET NO 60 MINE	WASHINGTON	PA	PITTSBURGH
54	1.3	EASTERN ASSOCIATED COAL CORP	JOANNE MINE	MARION	WV	PITTSBURGH
55	1.3	INLANO STEEL COAL CO	INLANO NO 1 MINE	JEFFERSON	IL	HERRIN NO 6
56	1.3	MID-CONTINENT RESOURCES INC	L S WOOD MINE	PITKIN	CO	COAL BASIN B
57	1.2	MULGA COAL CO	MULGA MINE	JEFFERSON	AL	PRATT
58	1.2	NORTH RIVER ENERGY CORP	NORTH RIVER MINE	FAYETTE	AL	PRATT
59	1.2	OLO BEN COAL CO	OLO BEN NO 26 MINE	FRANKLIN	IL	HERRIN NO 6
60	1.1	ALLIED CHEMICAL CORP	SHANNON BRANCH MINE	MCOOWELL	WV	POCAHONTAS NO 3 & 4
61	1.1	FREEMAN UNITEO COAL MINING CO	CROWN NO 2 MINE	MACOUPIN	IL	HERRIN NO 6
62	1.1	HELVETIA COAL CO	LUCERNE NO 6 MINE	INDIANA	PA	FREEPORT (U)
63	1.1	OLO BEN COAL CO	OLD BEN NO 21 MINE	FRANKLIN	IL	HERRIN NO 6
64	1.1	SOLDIER CREEK COAL CO	SOLOIER CANYON MINE	CARBON	UT	ROCK CANYON
65	1.0	CLINCHFIELD COAL CO	MCCLURE NO 1 MINE	OICKENSON	VA	JAWBONE
66	1.0	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 6 MINE	BUCHANAN	VA	POCAHONTAS NO 3
67	1.0	JIM WALTER RESOURCES INC	BESSIE MINE	JEFFERSON	AL	MARY LEE
68	1.0	PEABODY COAL CO	NO 10 MINE	CHRISTIAN	IL	HERRIN NO 6
69	1.0	QUARTO MINING CO	POWHATAN NO 4 MINE	MONROE	OH	PITTSBURGH
70	1.0	RANGER FUEL CORP	BECKLEY NO 2 MINE	WYOMING	WV	BECKLEY
71	0.9	BARNES & TUCKER CO	LANCASHIRE NO 20 MINE	CAMBRIA	PA	KITTANNING (U&L)
72	0.9	CLINCHFIELD COAL CO	MOSS NO 2 MINE	RUSSELL	VA	TILLER
73	0.9	EASTERN ASSOCIATEO COAL CORP	KEYSTONE NO 2 MINE	WYOMING	WV	POCAHONTAS NO 3

[1]U = Upper; L = Lower.

TABLE A-1.—Coal mines with emissions of at least 0.1 MMcfd, listed by order of emissions—Continued
(Within emission levels, listing is alphabetical by company name)

	METHANE, MMCFD	COMPANY NAME	MINE NAME	COUNTY	STATE	COALBED[1]
74	0.9	NATIONAL MINES CORP	NATIONAL POCAHONTAS MINE	WYOMING	WV	GILBERT, POCAHONTAS NO 3
75	0.9	PENNSYLVANIA MINES CORP	GREENWICH COLLIERIES NO 1 MINE	INDIANA	PA	FREEPORT (L)
76	0.9	PRICE RIVER COAL CO INC	PRICE NO 3 MINE	CARBON	UT	SUBSEAM NO 3
77	0.9	UNITED STATES STEEL CORP	MAPLE CREEK NO 2 MINE	WASHINGTON	PA	PITTSBURGH
78	0.9	WESTERN SLOPE CARBON INC	HAWKS NEST EAST MINE	GUNNISON	CO	E
79	0.9	YOUGHIOGHENY & OHIO COAL CO	NELMS NO 2 MINE	HARRISON	OH	FREEPORT (L)
80	0.8	CARBON FUEL CO	MORTON MINE	KANAWHA	WV	EAGLE
81	0.8	CONSOLIDATION COAL CO	RENTON MINE	ALLEGHENY	PA	FREEPORT (U&L)
82	0.8	JONES & LAUGHLIN STEEL CORP	SHANNOPIN MINE	GREENE	PA	PITTSBURGH
83	0.8	MID-CONTINENT RESOURCES INC	DUTCH CREEK NO 1 MINE	PITKIN	CO	COAL BASIN B
84	0.8	THE NACCO MINING CO	POWHATAN NO 6 MINE	BELMONT	OH	PITTSBURGH
85	0.8	UNITED STATES STEEL CORP	MAPLE CREEK NO 1 MINE	WASHINGTON	PA	PITTSBURGH
86	0.8	VALLEY CAMP COAL CO	VALLEY CAMP NO 3 MINE	OHIO	WV	PITTSBURGH
87	0.7	GEX COLORADO INC	ROADSIDE MINE	MESA	CO	CAMEO B
88	0.7	KAISER STEEL CORP	YORK CANYON MINE	COLFAX	NM	YORK
89	0.7	KEYSTONE COAL MINING CORP	URLING NO 1 MINE	INDIANA	PA	FREEPORT (L)
90	0.7	KEYSTONE COAL MINING CORP	URLING NO 3 MINE	INDIANA	PA	FREEPORT (L)
91	0.7	PEABODY COAL CO	EAGLE NO 2 MINE	GALLATIN	IL	HARRISBURG
92	0.7	PENNSYLVANIA MINES CORP	GREENWICH COLLIERIES NO 2 MINE	INDIANA	PA	FREEPORT (L)
93	0.7	RANGER FUEL CORP	BECKLEY NO 1 MINE	WYOMING	WV	BECKLEY, SEWELL
94	0.7	UNITED STATES STEEL CORP	SOMERSET MINE	GUNNISON	CO	B, C
95	0.6	ALABAMA BY-PRODUCTS CORP	SEGCO NO 1 MINE	WALKER	AL	MARY LEE
96	0.6	CF&I STEEL CORP	MAXWELL MINE	LAS ANIMAS	CO	APACHE
97	0.6	CLINCHFIELD COAL CO	LAMBERT FORK MINE	BUCHANAN	VA	TILLER
98	0.6	CONSOLIDATION COAL CO	MAITLAND MINE	MCDOWELL	WV	POCAHONTAS NO 3 & 4
99	0.6	JEWELL RIDGE COAL CORP	SEABOARD NO 1 MINE	TAZWELL	VA	SEABOARD (L)
100	0.6	LESLIE COAL MINING CO	LESLIE MINE	PIKE	KY	POND CREEK
101	0.6	OLD BEN COAL CO	OLD BEN NO 27 MINE	FRANKLIN	IL	HERRIN NO 6
102	0.6	REPUBLIC STEEL CORP	CLYDE MINE	WASHINGTON	PA	PITTSBURGH
103	0.6	ZEIGLER COAL CO	NO 5 MINE	DOUGLAS	IL	HERRIN NO 6
104	0.5	BEAR COAL CO INC	BEAR MINE	GUNNISON	CO	JUANITA C
105	0.5	CF&I STEEL CORP	ALLEN MINE	LAS ANIMAS	CO	ALLEN
106	0.5	CLINCHFIELD COAL CO	MOSS NO 4 MINE	DICKENSON	VA	TILLER
107	0.5	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 1 MINE	MCDOWELL	WV	POCAHONTAS NO 3
108	0.5	FREEMAN UNITED COAL MINING CO	ORIENT NO 6 MINE	JEFFERSON	IL	HERRIN NO 6
109	0.5	KEYSTONE COAL MINING CORP	JANE MINE	ARMSTRONG	PA	FREEPORT (L)
110	0.5	MAPCO INC	PONTIKI NO 1 MINE	MARTIN	KY	POND CREEK
111	0.5	MAPCO INC	PONTIKI NO 2 MINE	MARTIN	KY	POND CREEK
112	0.5	SOUTHERN OHIO COAL CO	MEIGS NO 2 MINE	MEIGS	OH	CLARION NO 4A
113	0.5	UNITED STATES STEEL CORP	DILWORTH MINE	GREENE	PA	PITTSBURGH
114	0.5	UNITED STATES STEEL CORP	GARY NO 10 MINE	MCDOWELL	WV	POCAHONTAS NO 3
115	0.4	BLUE DIAMOND COAL CO	SCOTIA MINE	LETCHER	KY	POND CREEK, TAGGART (U)
116	0.4	CONSOLIDATION COAL CO	EMERY MINE	EMERY	UT	FERRON I-J
117	0.4	CONSOLIDATION COAL CO	OAK PARK NO 7 MINE	HARRISON	OH	FREEPORT (L)
118	0.4	ISLAND CREEK COAL CO	8IRD NO 3 MINE	SOMEREST	PA	KITTANNING (L)
119	0.4	JIM WALTER RESOURCES INC	NEBO MINE	JEFFERSON	AL	MARY LEE
120	0.4	KAISER STEEL CORP	SUNNYSIDE NO 3 MINE	CARBON	UT	SUNNYSIDE (U&L)
121	0.4	NORTH AMERICAN COAL CORP	POWHATAN NO 1 MINE	BELMONT	OH	PITTSBURGH
122	0.4	QUARTO MINING CO	POWHATAN NO 7 MINE	MONROE	OH	PITTSBURGH
123	0.4	REPUBLIC STEEL CORP	NEWFIELD MINE	ALLEGHENY	PA	FREEPORT
124	0.4	SAHARA COAL CO INC	SAHARA NO 21 MINE	SALINE	IL	HARRISBURG
125	0.4	SEWELL COAL CO	SEWELL NO 1 MINE	NICHOLAS	WV	SEWELL
126	0.4	SLAB FORK COAL CO	SLAB FORK NO 10 MINE	RALEIGH	WV	POCAHONTAS NO 3
127	0.4	TUNNELTON MINING CO	MARION MINE	INDIANA	PA	FREEPORT (U)
128	0.4	VALLEY CAMP COAL CO	VALLEY CAMP NO 1 MINE	OHIO	WV	PITTSBURGH
129	0.4	WESTMORELAND COAL CO	FERRELL NO 17 MINE	8OONE	WV	CEDAR GROVE
130	0.4	WESTMORELAND COAL CO	HAMPTON NO 3 MINE	BOONE	WV	CEDAR GROVE
131	0.3	ALABAMA 8Y-PRODUCTS CORP	CHETOPA MINE	JEFFERSON	AL	MARY LEE
132	0.3	ALABAMA 8Y-PRODUCTS CORP	MARY LEE NO 2 MINE	WALKER	AL	MARY LEE
133	0.3	BARNES & TUCKER CO	LANCASHIRE NO 24 B MINE	CAMBRIA	PA	FREEPORT (L)
134	0.3	8ETHLEHEM MINES CORP	ELLSWORTH NO 51 MINE	WASHINGTON	PA	PITTSBURGH
135	0.3	8ISHOP COAL CO	BISHOP NO 33 & 37 MINES	MCDOWELL	WV	POCAHONTAS NO 3
136	0.3	CANNELTON INDUSTRIES INC	LADY DUNN NO 105 MINE	KANAWHA	WV	POWELLTON, NO 2 GAS
137	0.3	CLINCHFIELD COAL CO	MOSS NO 3 PORTAL A2 MINE	DICKENSON	VA	TILLER
138	0.3	DUQUESNE LIGHT CO	WARWICK PORTAL NO 3 MINE	GREENE	PA	PITTSBURGH
139	0.3	FREEMAN UNITED COAL MINING CO	ORIENT NO 4 MINE	WILLIAMSON	IL	HERRIN NO 6
140	0.3	ISLAND CREEK COAL CO	8IG CREEK NO 1 MINE	PIKE	KY	POND CREEK
141	0.3	JONES & LAUGHLIN STEEL CORP	NEMACOLIN MINE	GREENE	PA	PITTSBURGH
142	0.3	MONTEREY COAL CO	MONTEREY NO 2 MINE	CLINTON	IL	HERRIN NO 6
143	0.3	PRICE RIVER COAL CO INC	PRICE RIVER NO 5 MINE	CAR8ON	UT	SU8SEAM NO 3
144	0.3	SOUTHERN OHIO COAL CO	MEIGS NO 1 MINE	MEIGS	OH	CLARION NO 4A
145	0.3	UNITED STATES STEEL CORP	GARY NO 2 MINE	MCDOWELL	WV	POCAHONTAS NO 4
146	0.3	WESTMORELAND COAL CO	BULLITT MINE	WISE	VA	DORCHESTER
147	0.3	WESTMORELAND COAL CO	EAST GULF MINE	RALEIGH	WV	POCAHONTAS NO 3
148	0.3	WOLF CREEK COLLIERIES INC CO	NO 4 MINE	MARTIN	KY	WARFIELD, COAL8URG
149	0.3	ZEIGLER COAL CO	MURDOCK MINE	DOUGLAS	IL	HERRIN NO 6
150	0.2	AFFININTY MINING CO	KEYSTONE NO 5 MINE	RALEIGH	WV	POCAHONTAS NO 3

[1]U = Upper; L = Lower.

TABLE A-1.—Coal mines with emissions of at least 0.1 MMcfd, listed by order of emissions—Continued
(Within emission levels, listing is alphabetical by company name)

	METHANE, MMCFO	COMPANY NAME	MINE NAME	COUNTY	STATE	COALBED[1]
151	0.2	BARNES & TUCKER CO	LANCASHIRE NO 25 MINE	CAMBRIA	PA	FREEPORT (L)
152	0.2	BETHLEHEM MINES CORP	NANTY GLO MINE 31	CAMBRIA	PA	KITTANNING (L)
153	0.2	BISHOP COAL CO	BISHOP NO 34 MINE	MCOOWELL	WV	POCAHONTAS NO 3
154	0.2	BISHOP COAL CO	BISHOP NO 36 MINE	MCOOWELL	WV	POCAHONTAS NO 3 & 5
155	0.2	CONSOLIDATION COAL CO	HILLSBORO MINE	MONTGOMERY	IL	HERRIN NO 6
156	0.2	CONSOLIOATION COAL CO	WESTLANO MINE	WASHINGTON	PA	PITTSBURGH
157	0.2	CRYSTAL RIVER COAL CO	NO 1 MINE	MINGO	WV	ALMA
158	0.2	OOMINION COAL CORP	WINSTON NO 10 MINE	BUCHANAN	VA	JAWBONE
159	0.2	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 4 MINE	RALEIGH	WV	POCAHONTAS NO 3 & 4
160	0.2	EASTERN ASSOCIATEO COAL CORP	WHARTON NO 4 MINE	BOONE	WV	POND CREEK
161	0.2	EASTOVER MINING CO	HARLAN NO 1 MINE	HARLAN	KY	HARLAN
162	0.2	FLORENCE MINING CO	FLORENCE NO 1 MINE	INOIANA	PA	B
163	0.2	GEX COLORAOO INC	CAMEO NO 1 MINE	MESA	CO	CAMEO B
164	0.2	HELVETIA COAL CO	LUCERNE NO 9 MINE	INOIANA	PA	FREEPORT (L)
165	0.2	INLAND STEEL COAL CO	INLANO NO 2 MINE	HAMILTON	IL	HARRISBURG
166	0.2	JEWELL RIOGE COAL CORP	SEABOARO NO 2 MINE	TAZWELL	VA	SEABOARO (L)
167	0.2	KENELLIS CO	BRUSHY CREEK MINE	SALINE	IL	HERRIN NO 6
168	0.2	NATIONAL MINES CORP	ISABELLA MINE	FAYETTE	PA	PITTSBURGH
169	0.2	NORTH AMERICAN COAL CORP	POWHATAN NO 3 MINE	BELMONT	OH	PITTSBURGH
170	0.2	PEABODY COAL CO	BALOWIN NO 1 MINE	RANOOLPH	IL	HERRIN NO 6
171	0.2	PEABOOY COAL CO	RIVER KING UG NO 1 MINE	ST CLAIR	IL	HERRIN NO 6
172	0.2	SCOTTS BRANCH CO	SCOTTS BRANCH MINE	PIKE	KY	POND CREEK
173	0.2	WESTMORELANO COAL CO	PRESCOTT NO 2 MINE	WISE	VA	PONO CREEK
174	0.2	WESTMORELANO COAL CO	WENTZ B PORTAL MINE	WISE	VA	TAGGART
175	0.2	WESTMORELANO COAL CO	WENTZ NO 1 MINE	WISE	VA	TAGGART
176	0.2	YOUGHIOGHENY & OHIO COAL CO	ALLISON MINE	BELMONT	OH	PITTSBURGH
177	0.1	BLUE DIAMOND COAL CO	JUSTUS MINE	MCCREARY	KY	NO 1-1/2 & 2
178	0.1	CANNELTON INOUSTRIES INC	CANNELTON NO 8 MINE	KANAWHA	WV	EAGLE
179	0.1	CANNELTON INOUSTRIES INC	NO 3 & 4 MINE	MCOOWELL	WV	POCAHONTAS NO 4
180	0.1	CLINCHFIELO COAL CO	HURRICANE CREEK MINE	RUSSELL	VA	JAWBONE
181	0.1	CONSOLIOATION COAL CO	MATTHEWS MINE	CLAIBORNE	TN	JELLICO
182	0.1	CONSOLIOATION COAL CO	WESTLANO NO 2 MINE	WASHINGTON	PA	PITTSBURGH
183	0.1	DELMONT RESOURCES INC	OELMONT MINE	WESTMORELANO	PA	FREEPORT (U)
184	0.1	EASTERN ASSOCIATED COAL CORP	OELMONT MINE	WESTMORELANO	PA	FREEPORT (U)
185	0.1	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 4-A MINE	RALEIGH	WV	POCAHONTAS NO 3 & 4
186	0.1	EASTERN ASSOCIATEO COAL CORP	KOPPERSTON NO 1 MINE	WYOMING	WV	EAGLE
187	0.1	EASTOVER MINING CO	VIRGINIA NO 1 MINE	WISE	VA	JAWBONE
188	0.1	ISLANO CREEK COAL CO	BIG CREEK NO 2 MINE	PIKE	KY	POND CREEK
189	0.1	ISLAND CREEK COAL CO	BIRO NO 2 MINE	SOMERSET	PA	KITTANNING (U&L)
190	0.1	JEWELL RIOGE COAL CORP	JEWELL NO 18 MINE	BUCHANAN	VA	JEWELL
191	0.1	PARAMOUNT MINING CORP	NO 7 MINE	WISE	VA	NORTON
192	0.1	REPUBLIC STEEL CORP	BANNING MINE	WESTMORELAND	PA	PITTSBURGH
193	0.1	SAHARA COAL CO INC	SAHARA NO 20 MINE	SALINE	IL	HARRISBURG
194	0.1	SNOMASS COAL CO	THOMPSON CREEK NO 1 MINE	PITKIN	CO	A
195	0.1	THE NEW RIVER CO	SILTIX MINE	FAYETTE	WV	SEWELL
196	0.1	UNITEO STATES STEEL CORP	GARY NO 20-B MINE	MINGO	WV	ALMA
197	0.1	WESTMORELANO COAL CO	WINOING GULF NO 4 MINE	RALEIGH	WV	POCAHONTAS NO 4
198	0.1	YOUGHIOGHENY & OHIO COAL CO	NELMS CAOIZ PORTAL MINE	HARRISON	OH	FREEPORT (L)
199	0.1	ZEIGLER COAL CO	NO 11 MINE	RANOOLPH	IL	HERRIN NO 6
200	0.1	ZEIGLER COAL CO	SPARTAN MINE	RANDOLPH	IL	HERRIN NO 6

[1]U = Upper; L = Lower.

Source: MSHA and references 10, 12.

TABLE A-2.—Coal mines with emissions of at least 0.1 MMcfd, listed by coalbed
(Within a coalbed, listing is by emission level, location, and company name)

COALBED[1]	METHANE, MMCFD	STATE	COUNTY	COMPANY NAME	MINE NAME
A	0.1	CO	PITKIN	SNOMASS COAL CO	THOMPSON CREEK NO 1 MINE
ALLEN	0.5	CD	LAS ANIMAS	CF&I STEEL CORP	ALLEN MINE
ALMA	D.2	WV	MINGO	CRYSTAL RIVER COAL CO	NO 1 MINE
ALMA	0.1	WV	MINGO	UNITED STATES STEEL CORP	GARY NO 20-B MINE
APACHE	0.6	CO	LAS ANIMAS	CF&I STEEL CORP	MAXWELL MINE
B	0.2	PA	INDIANA	FLORENCE MINING CO	FLORENCE NO 1 MINE
B, C	D.7	CO	GUNNISON	UNITED STATES STEEL CORP	SOMERSET MINE
BECKLEY	5.1	WV	RALEIGH	BECKLEY COAL CO	BECKLEY MINE
BECKLEY	2.5	WV	RALEIGH	MAPLE MEAOOW MINING CO	NO 1 MINE
BECKLEY	1.5	WV	RALEIGH	BECKLEY LICK RUN CO	BONNY MINE
BECKLEY	1.D	WV	WYOMING	RANGER FUEL CORP	BECKLEY NO 2 MINE
BECKLEY, SEWELL	0.7	WV	WYOMING	RANGER FUEL CORP	BECKLEY NO 1 MINE
CAMEO B	D.7	CO	MESA	GEX COLORADO INC	ROADSIOE MINE
CAMEO B	0.2	CO	MESA	GEX COLORADO INC	CAMEO NO 1 MINE
CEDAR GROVE	0.4	WV	BOONE	WESTMORELAND COAL CO	FERRELL NO 17 MINE
CEDAR GROVE	0.4	WV	BOONE	WESTMORELAND COAL CO	HAMPTON NO 3 MINE
CLARION NO 4A	D.5	OH	MEIGS	SOUTHERN OHIO COAL CO	MEIGS NO 2 MINE
CLARION NO 4A	0.3	OH	MEIGS	SOUTHERN OHIO COAL CO	MEIGS NO 1 MINE
COAL BASIN B	1.6	CO	PITKIN	MID-CONTINENT RESOURCES INC	COAL BASIN MINE
COAL BASIN B	1.4	CO	PITKIN	MIO-CONTINENT RESOURCES INC	DUTCH CREEK NO 2 MINE
COAL BASIN B	1.3	CO	PITKIN	MID-CONTINENT RESOURCES INC	L S WOOO MINE
COAL BASIN B	0.8	CO	PITKIN	MID-CONTINENT RESOURCES INC	DUTCH CREEK NO 1 MINE
DORCHESTER	0.3	VA	WISE	WESTMORELAND COAL CO	BULLITT MINE
E	0.9	CO	GUNNISON	WESTERN SLOPE CARBON INC	HAWKS NEST EAST MINE
EAGLE	0.8	WV	KANAWHA	CARBON FUEL CO	MORTON MINE
EAGLE	0.1	WV	KANAWHA	CANNELTON INOUSTRIES INC	CANNELTON NO 8 MINE
EAGLE	0.1	WV	WYOMING	EASTERN ASSOCIATEO COAL CORP	KOPPERSTON NO 1 MINE
FERRON I-J	D.4	UT	EMERY	CONSOLIDATION COAL CO	EMERY MINE
FREEPORT	D.4	PA	ALLEGHENY	REPUBLIC STEEL CORP	NEWFIELD MINE
FREEPORT (L)	D.9	OH	HARRISON	YOUGHIOGHENY & OHIO COAL CO	NELMS NO 2 MINE
FREEPORT (L)	D.9	PA	INOIANA	PENNSYLVANIA MINES CORP	GREENWICH COLLIERIES NO 1 MINE
FREEPORT (L)	D.7	PA	INOIANA	KEYSTONE COAL MINING CORP	URLING NO 1 MINE
FREEPORT (L)	D.7	PA	INOIANA	KEYSTONE COAL MINING CORP	URLING NO 3 MINE
FREEPORT (L)	0.7	PA	INDIANA	PENNSYLVANIA MINES CORP	GREENWICH COLLIERIES NO 2 MINE
FREEPORT (L)	0.5	PA	ARMSTRONG	KEYSTONE COAL MINING CORP	JANE MINE
FREEPORT (L)	0.4	OH	HARRISON	CONSOLIOATION COAL CO	OAK PARK NO 7 MINE
FREEPORT (L)	0.3	PA	CAMBRIA	BARNES & TUCKER CO	LANCASHIRE NO 24 B MINE
FREEPORT (L)	0.2	PA	CAMBRIA	BARNES & TUCKER CO	LANCASHIRE NO 25 MINE
FREEPORT (L)	0.2	PA	INOIANA	HELVETIA COAL CO	LUCERNE NO 9 MINE
FREEPORT (L)	0.1	OH	HARRISON	YOUGHIOGHENY & OHIO COAL CO	NELMS CADIZ PORTAL MINE
FREEPORT (U&L)	0.8	PA	ALLEGHENY	CONSOLIDATION COAL CO	RENTON MINE
FREEPORT (U)	2.5	PA	INDIANA	HELEN MINING CO	HOMER CITY MINE
FREEPORT (U)	1.1	PA	INDIANA	HELVETIA COAL CO	LUCERNE NO 6 MINE
FREEPORT (U)	0.4	PA	INDIANA	TUNNELTON MINING CO	MARION MINE
FREEPORT (U)	0.1	PA	WESTMORELAND	DELMONT RESOURCES INC	OELMONT MINE
FREEPORT (U)	0.1	PA	WESTMORELAND	EASTERN ASSOCIATEO COAL CORP	DELMONT MINE
GILBERT, POCAHONTAS NO 3	0.9	WV	WYOMING	NATIONAL MINES CORP	NATIONAL POCAHONTAS MINE
HARLAN	0.2	KY	HARLAN	EASTOVER MINING CO	HARLAN NO 1 MINE
HARRISBURG	1.5	IL	WABASH	AMAX COAL CO	WABASH MINE
HARRISBURG	0.7	IL	GALLATIN	PEABODY COAL CO	EAGLE NO 2 MINE
HARRISBURG	D.4	IL	SALINE	SAHARA COAL CO INC	SAHARA NO 21 MINE
HARRISBURG	0.2	IL	HAMILTON	INLANO STEEL COAL CO	INLAND NO 2 MINE
HARRISBURG	0.1	IL	SALINE	SAHARA COAL CO INC	SAHARA NO 20 MINE
HERRIN ND 6	2.3	IL	FRANKLIN	OLO BEN COAL CO	OLD BEN NO 25 MINE
HERRIN NO 6	1.5	IL	JEFFERSON	FREEMAN UNITEO COAL MINING CO	ORIENT NO 3 MINE
HERRIN NO 6	1.4	IL	MACOUPIN	MONTEREY COAL CO	MONTEREY NO 1 MINE
HERRIN NO 6	1.3	IL	JEFFERSON	INLANO STEEL COAL CO	INLAND NO 1 MINE
HERRIN NO 6	1.2	IL	FRANKLIN	OLO BEN COAL CO	OLD BEN NO 26 MINE
HERRIN NO 6	1.1	IL	FRANKLIN	OLD BEN COAL CO	OLD BEN NO 21 MINE
HERRIN NO 6	1.1	IL	MACOUPIN	FREEMAN UNITEO COAL MINING CO	CROWN NO 2 MINE
HERRIN ND 6	1.D	IL	CHRISTIAN	PEABODY COAL CO	NO 10 MINE
HERRIN NO 6	0.6	IL	DOUGLAS	ZEIGLER COAL CO	NO 5 MINE
HERRIN NO 6	0.6	IL	FRANKLIN	OLD BEN COAL CO	OLO BEN NO 27 MINE
HERRIN NO 6	0.5	IL	JEFFERSON	FREEMAN UNITED COAL MINING CO	ORIENT NO 6 MINE
HERRIN NO 6	0.3	IL	CLINTON	MONTEREY COAL CO	MONTEREY NO 2 MINE
HERRIN NO 6	0.3	IL	OOUGLAS	ZEIGLER COAL CO	MUROOCK MINE
HERRIN NO 6	0.3	IL	WILLIAMSDN	FREEMAN UNITED COAL MINING CO	ORIENT NO 4 MINE
HERRIN NO 6	0.2	IL	MONTGOMERY	CONSOLIOATION COAL CO	HILLSBORO MINE
HERRIN NO 6	D.2	IL	RANOOLPH	PEABODY COAL CO	BALDWIN NO 1 MINE
HERRIN NO 6	0.2	IL	SALINE	KENELLIS CO	BRUSHY CREEK MINE
HERRIN NO 6	0.2	IL	ST CLAIR	PEABODY COAL CO	RIVER KING UG NO 1 MINE
HERRIN NO 6	0.1	IL	RANDOLPH	ZEIGLER COAL CO	NO 11 MINE
HERRIN NO 6	0.1	IL	RANOOLPH	ZEIGLER COAL CO	SPARTAN MINE
JAWBONE	1.0	VA	DICKENSON	CLINCHFIELD COAL CO	MCCLURE NO 1 MINE
JAWBONE	0.2	VA	BUCHANAN	DOMINION COAL CORP	WINSTON NO 10 MINE

[1]U = Upper; L = Lower.

TABLE A-2.—Coal mines with emissions of at least 0.1 MMcfd, listed by coalbed—Continued

(Within a coalbed, listing is by emission level, location, and company name)

COALBED[1]	METHANE, MMCFD	STATE	COUNTY	COMPANY NAME	MINE NAME
JAWBONE	0.1	VA	RUSSELL	CLINCHFIELD COAL CO	HURRICANE CREEK MINE
JAWBONE	0.1	VA	WISE	EASTOVER MINING CO	VIRGINIA NO 1 MINE
JELLICO	0.1	TN	CLAIBORNE	CONSOLIOATION COAL CO	MATTHEWS MINE
JEWELL	0.1	VA	BUCHANAN	JEWELL RIOGE COAL CORP	JEWELL NO 18 MINE
JUANITA C	0.5	CO	GUNNISON	BEAR COAL CO INC	BEAR MINE
KITTANNING (L)	3.4	PA	CAMBRIA	BETHLEHEM MINES CORP	BETHLEHEM NO 32 & 33 MINE
KITTANNING (L)	1.5	WV	BARBOUR	REPUBLIC STEEL CORP	KITT NO 1 MINE
KITTANNING (L)	0.4	PA	SOMEREST	ISLAND CREEK COAL CO	BIRD NO 3 MINE
KITTANNING (L)	0.2	PA	CAMBRIA	BETHLEHEM MINES CORP	NANTY GLO MINE 31
KITTANNING (U&L)	0.9	PA	CAMBRIA	BARNES & TUCKER CO	LANCASHIRE NO 20 MINE
KITTANNING (U&L)	0.1	PA	SOMERSET	ISLAND CREEK COAL CO	BIRD NO 2 MINE
MARY LEE	16.5	AL	TUSCALOOSA	JIM WALTER RESOURCES INC	BLUE CREEK NO 4 MINE
MARY LEE	11.1	AL	JEFFERSON	JIM WALTER RESOURCES INC	BLUE CREEK NO 3 MINE
MARY LEE	6.2	AL	TUSCALOOSA	JIM WALTER RESOURCES INC	BLUE CREEK NO 5 MINE
MARY LEE	5.0	AL	JEFFERSON	UNITEO STATES STEEL CORP	OAK GROVE MINE
MARY LEE	4.2	AL	TUSCALOOSA	JIM WALTER RESOURCES INC	BLUE CREEK NO 7 MINE
MARY LEE	1.9	AL	WALKER	ALABAMA BY-PRODUCTS CORP	MARY LEE NO 1 MINE
MARY LEE	1.0	AL	JEFFERSON	JIM WALTER RESOURCES INC	BESSIE MINE
MARY LEE	0.6	AL	WALKER	ALABAMA BY-PROOUCTS CORP	SEGCO NO 1 MINE
MARY LEE	0.4	AL	JEFFERSON	JIM WALTER RESOURCES INC	NEBO MINE
MARY LEE	0.3	AL	JEFFERSON	ALABAMA BY-PROOUCTS CORP	CHETOPA MINE
MARY LEE	0.3	AL	WALKER	ALABAMA BY-PRODUCTS CORP	MARY LEE NO 2 MINE
NO 1-1/2 & 2	0.1	KY	MCCREARY	BLUE OIAMOND COAL CO	JUSTUS MINE
NORTON	0.1	VA	WISE	PARAMOUNT MINING CORP	NO 7 MINE
PITTSBURGH	8.2	WV	MARION	CONSOLIOATION COAL CO	LOVERIDGE NO 22 MINE
PITTSBURGH	7.6	WV	MONONGALIA	EASTERN ASSOCIATED COAL CORP	FEOERAL NO 2 MINE
PITTSBURGH	7.2	WV	MONONGALIA	CONSOLIOATION COAL CO	HUMPHREY NO 7 MINE
PITTSBURGH	5.3	WV	MONONGALIA	CONSOLIOATION COAL CO	BLACKSVILLE NO 2 MINE
PITTSBURGH	5.0	WV	MONONGALIA	CONSOLIDATION COAL CO	ARKWRIGHT MINE
PITTSBURGH	4.7	PA	GREENE	UNITEO STATES STEEL CORP	CUMBERLAND MINE
PITTSBURGH	4.7	WV	MONONGALIA	CONSOLIOATION COAL CO	OSAGE NO 3 MINE
PITTSBURGH	4.4	WV	MONONGALIA	CONSOLIOATION COAL CO	BLACKSVILLE NO 1 MINE
PITTSBURGH	2.9	WV	MONONGALIA	CONSOLIDATION COAL CO	PURSGLOVE NO 15 MINE
PITTSBURGH	2.8	PA	GREENE	JONES & LAUGHLIN STEEL CORP	GATEWAY MINE
PITTSBURGH	2.6	WV	MARION	EASTERN ASSOCIATED COAL CORP	FEOERAL NO 1 MINE
PITTSBURGH	2.2	PA	WASHINGTON	CONSOLIDATION COAL CO	MONTOUR NO 4 MINE
PITTSBURGH	2.2	WV	MARSHALL	CONSOLIDATION COAL CO	IRELANO MINE
PITTSBURGH	2.1	PA	GREENE	UNITEO STATES STEEL CORP	ROBENA MINE
PITTSBURGH	2.0	PA	GREENE	EMWAY RESOURCES INC	EMERALO MINE
PITTSBURGH	2.0	WV	HARRISON	CONSOLIDATION COAL CO	ROBINSON RUN NO 95 MINE
PITTSBURGH	1.8	PA	WASHINGTON	MATHIES COAL CO	MATHIES MINE
PITTSBURGH	1.7	WV	MARSHALL	CONSOLIDATION COAL CO	SHOEMAKER MINE
PITTSBURGH	1.6	PA	WASHINGTON	BETHLEHEM MINES CORP	MARIANNA NO 58 MINE
PITTSBURGH	1.5	WV	MARSHALL	CONSOLIOATION COAL CO	MCELROY MINE
PITTSBURGH	1.4	PA	WASHINGTON	JONES & LAUGHLIN STEEL CORP	VESTA NO 5 MINE
PITTSBURGH	1.4	WV	MARION	CONSOLIOATION COAL CO	CONSOL NO 20 MINE
PITTSBURGH	1.3	PA	WASHINGTON	BETHLEHEM MINES CORP	SOMERSET NO 60 MINE
PITTSBURGH	1.3	WV	MARION	EASTERN ASSOCIATEO COAL CORP	JOANNE MINE
PITTSBURGH	1.0	OH	MONROE	QUARTO MINING CO	POWHATAN NO 4 MINE
PITTSBURGH	0.9	PA	WASHINGTON	UNITED STATES STEEL CORP	MAPLE CREEK NO 2 MINE
PITTSBURGH	0.8	OH	BELMONT	THE NACCO MINING CO	POWHATAN NO 6 MINE
PITTSBURGH	0.8	PA	GREENE	JONES & LAUGHLIN STEEL CORP	SHANNOPIN MINE
PITTSBURGH	0.8	PA	WASHINGTON	UNITEO STATES STEEL CORP	MAPLE CREEK NO 1 MINE
PITTSBURGH	0.8	WV	OHIO	VALLEY CAMP COAL CO	VALLEY CAMP NO 3 MINE
PITTSBURGH	0.6	PA	WASHINGTON	REPUBLIC STEEL CORP	CLYOE MINE
PITTSBURGH	0.5	PA	GREENE	UNITED STATES STEEL CORP	OILWORTH MINE
PITTSBURGH	0.4	OH	BELMONT	NORTH AMERICAN COAL CORP	POWHATAN NO 1 MINE
PITTSBURGH	0.4	OH	MONROE	QUARTO MINING CO	POWHATAN NO 7 MINE
PITTSBURGH	0.4	WV	OHIO	VALLEY CAMP COAL CO	VALLEY CAMP NO 1 MINE
PITTSBURGH	0.3	PA	GREENE	DUQUESNE LIGHT CO	WARWICK PORTAL NO 3 MINE
PITTSBURGH	0.3	PA	GREENE	JONES & LAUGHLIN STEEL CORP	NEMACOLIN MINE
PITTSBURGH	0.3	PA	WASHINGTON	BETHLEHEM MINES CORP	ELLSWORTH NO 51 MINE
PITTSBURGH	0.2	OH	BELMONT	NORTH AMERICAN COAL CORP	POWHATAN NO 3 MINE
PITTSBURGH	0.2	OH	BELMONT	YOUGHIOGHENY & OHIO COAL CO	ALLISON MINE
PITTSBURGH	0.2	PA	FAYETTE	NATIONAL MINES CORP	ISABELLA MINE
PITTSBURGH	0.2	PA	WASHINGTON	CONSOLIOATION COAL CO	WESTLANO MINE
PITTSBURGH	0.1	PA	WASHINGTON	CONSOLIOATION COAL CO	WESTLANO NO 2 MINE
PITTSBURGH	0.1	PA	WESTMORELAND	REPUBLIC STEEL CORP	BANNING MINE
POCAHONTAS NO 3	7.8	VA	BUCHANAN	ISLANO CREEK COAL CO	VIRGINIA POCAHONTAS NO 3 MINE
POCAHONTAS NO 3	7.3	VA	BUCHANAN	VP 5 MINING CO	VP NO 5 MINE
POCAHONTAS NO 3	5.6	VA	BUCHANAN	ISLANO CREEK COAL CO	VIRGINIA POCAHONTAS NO 1 MINE
POCAHONTAS NO 3	4.5	VA	BUCHANAN	BEATRICE POCAHONTAS CO	BEATRICE MINE
POCAHONTAS NO 3	2.8	WV	WYOMING	UNITEO STATES STEEL CORP	GARY NO 50 MINE
POCAHONTAS NO 3	1.7	VA	BUCHANAN	ISLANO CREEK COAL CO	VIRGINIA POCAHONTAS NO 2 MINE
POCAHONTAS NO 3	1.5	VA	BUCHANAN	ISLANO CREEK COAL CO	VIRGINIA POCAHONTAS NO 4 MINE

[1]U = Upper; L = Lower.

TALBLE A-2.—Coal mines with emissions of at least 0.1 MMcfd, listed by coalbed—Continued
(Within a coalbed, listing is by emission level, location, and company name)

COALBED[1]	METHANE, MMCFD	STATE	COUNTY	COMPANY NAME	MINE NAME
POCAHONTAS NO 3	1.4	WV	WYOMING	ITMANN COAL CO	ITMANN NO 3 MINE
POCAHONTAS NO 3	1.0	VA	BUCHANAN	ISLAND CREEK COAL CO	VIRGINIA POCAHONTAS NO 6 MINE
POCAHONTAS NO 3	0.9	WV	WYOMING	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 2 MINE
POCAHONTAS NO 3	0.5	WV	MCDOWELL	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 1 MINE
POCAHONTAS NO 3	0.5	WV	MCOOWELL	UNITED STATES STEEL CORP	GARY NO 10 MINE
POCAHONTAS NO 3	0.4	WV	RALEIGH	SLAB FORK COAL CO	SLAB FORK NO 10 MINE
POCAHONTAS NO 3	0.3	WV	MCDOWELL	BISHOP COAL CO	BISHOP NO 33 & 37 MINES
POCAHONTAS NO 3	0.3	WV	RALEIGH	WESTMORELAND COAL CO	EAST GULF MINE
POCAHONTAS NO 3	0.2	WV	MCDOWELL	BISHOP COAL CO	BISHOP NO 34 MINE
POCAHONTAS NO 3	0.2	WV	RALEIGH	AFFININTY MINING CO	KEYSTONE NO 5 MINE
POCAHONTAS NO 3 & 4	1.1	WV	MCDOWELL	ALLIED CHEMICAL CORP	SHANNON BRANCH MINE
POCAHONTAS NO 3 & 4	0.6	WV	MCDOWELL	CONSOLIDATION COAL CO	MAITLAND MINE
POCAHONTAS NO 3 & 4	0.2	WV	RALEIGH	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 4 MINE
POCAHONTAS NO 3 & 4	0.1	WV	RALEIGH	EASTERN ASSOCIATED COAL CORP	KEYSTONE NO 4-A MINE
POCAHONTAS NO 3 & 5	0.2	WV	MCDOWELL	BISHOP COAL CO	BISHOP NO 36 MINE
POCAHONTAS NO 4	1.4	WV	MCDOWELL	CONSOLIDATION COAL CO	AMONATE NO 31 MINE
POCAHONTAS NO 4	0.3	WV	MCDOWELL	UNITED STATES STEEL CORP	GARY NO 2 MINE
POCAHONTAS NO 4	0.1	WV	MCDOWELL	CANNELTON INDUSTRIES INC	NO 3 & 4 MINE
POCAHONTAS NO 4	0.1	WV	RALEIGH	WESTMORELAND COAL CO	WINDING GULF NO 4 MINE
POCAHONTAS NO 4, SEWELL	2.0	WV	MCDOWELL	JONES & LAUGHLIN STEEL CORP	OLGA MINE
POND CREEK	0.6	KY	PIKE	LESLIE COAL MINING CO	LESLIE MINE
POND CREEK	0.5	KY	MARTIN	MAPCO INC	PONTIKI NO 1 MINE
POND CREEK	0.5	KY	MARTIN	MAPCO INC	PONTIKI NO 2 MINE
POND CREEK	0.3	KY	PIKE	ISLAND CREEK COAL CO	BIG CREEK NO 1 MINE
POND CREEK	0.2	KY	PIKE	SCOTTS BRANCH CO	SCOTTS BRANCH MINE
POND CREEK	0.2	VA	WISE	WESTMORELAND COAL CO	PRESCOTT NO 2 MINE
POND CREEK	0.2	WV	BOONE	EASTERN ASSOCIATED COAL CORP	WHARTON NO 4 MINE
POND CREEK	0.1	KY	PIKE	ISLAND CREEK COAL CO	BIG CREEK NO 2 MINE
POND CREEK, TAGGART (U)	0.4	KY	LETCHER	BLUE DIAMOND COAL CO	SCOTIA MINE
POWELLTON, NO 2 GAS	0.3	WV	KANAWHA	CANNELTON INDUSTRIES INC	LADY DUNN NO 105 MINE
PRATT	1.5	AL	JEFFERSON	UNITED STATES STEEL CORP	CONCORD MINE
PRATT	1.2	AL	FAYETTE	NORTH RIVER ENERGY CORP	NORTH RIVER MINE
PRATT	1.2	AL	JEFFERSON	MULGA COAL CO	MULGA MINE
ROCK CANYON	1.1	UT	CARBON	SOLDIER CREEK COAL CO	SOLDIER CANYON MINE
SEABOARD (L)	0.6	VA	TAZWELL	JEWELL RIDGE COAL CORP	SEABOARD NO 1 MINE
SEABOARD (L)	0.2	VA	TAZWELL	JEWELL RIDGE COAL CORP	SEABOARD NO 2 MINE
SEWELL	0.4	WV	NICHOLAS	SEWELL COAL CO	SEWELL NO 1 MINE
SEWELL	0.1	WV	FAYETTE	THE NEW RIVER CO	SILTIX MINE
SUBSEAM NO 3	0.9	UT	CARBON	PRICE RIVER COAL CO INC	PRICE NO 3 MINE
SUBSEAM NO 3	0.3	UT	CARBON	PRICE RIVER COAL CO INC	PRICE RIVER NO 5 MINE
SUNNYSIDE (U&L)	2.0	UT	CARBON	KAISER STEEL CORP	SUNNYSIDE NO 1 MINE
SUNNYSIDE (U&L)	0.4	UT	CARBON	KAISER STEEL CORP	SUNNYSIDE NO 3 MINE
TAGGART	0.2	VA	WISE	WESTMORELAND COAL CO	WENTZ B PORTAL MINE
TAGGART	0.2	VA	WISE	WESTMORELAND COAL CO	WENTZ NO 1 MINE
TILLER	0.9	VA	RUSSELL	CLINCHFIELD COAL CO	MOSS NO 2 MINE
TILLER	0.6	VA	BUCHANAN	CLINCHFIELD COAL CO	LAMBERT FORK MINE
TILLER	0.5	VA	DICKENSON	CLINCHFIELD COAL CO	MOSS NO 4 MINE
TILLER	0.3	VA	DICKENSON	CLINCHFIELD COAL CO	MOSS NO 3 PORTAL A2 MINE
WARFIELD, COALBURG	0.3	KY	MARTIN	WOLF CREEK COLLIERIES INC CO	NO 4 MINE
YORK	0.7	NM	COLFAX	KAISER STEEL CORP	YORK CANYON MINE

[1]U = Upper; L = Lower.

Source: MSHA and references 10, 12.

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